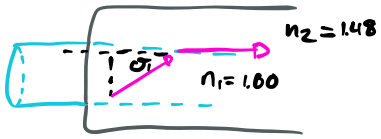
P: 14, 16, 18, 53

23.P.14

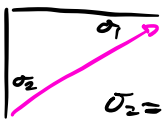


T.I.R ?
$\theta_2 = 90$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_1 = \sin^{-1}\left(\frac{n_2}{n_1}\right)$

$\theta_1 = 67.66°$

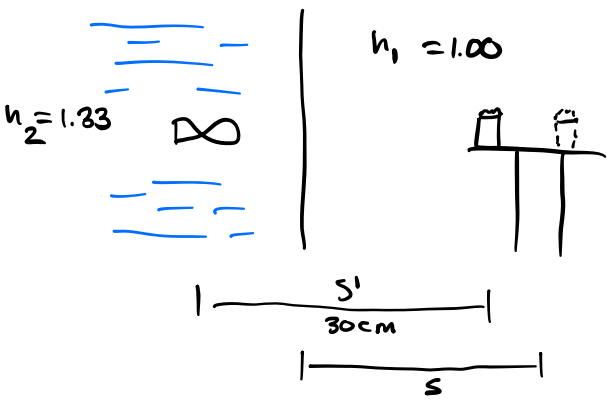


$\theta_2 = 90 - \theta_1$

$\theta_2 = 22.34°$

$\theta_2 = 22.34°$

23.P.16

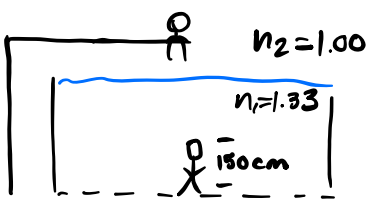


$\frac{s'}{s} = \frac{n_2}{n_1}$

$s = \frac{1.00}{1.33}(30cm) = 22.6\,cm$

$s = 22.6cm$

23.P.18



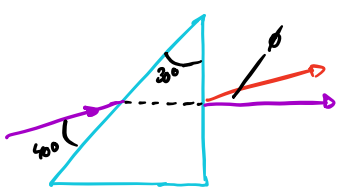
$s' = \frac{n_2}{n_1} s$

$\frac{s'}{s} = \frac{n_2}{n_1}$

$s' = \frac{1.00}{1.33} 150 = 112.78\,cm$

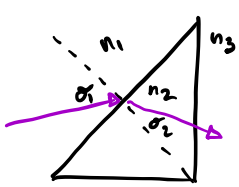
$s' = 112.78cm$

23.P.53



Red $\theta = \theta_R - \theta_V = 30.72 - 30.04$

$\theta = 0.68°$



$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

$n_1 = 1.00$ $n_2 = 1.53$ ← Violet 1.50×1.02

$\theta_1 = 50$ $\theta_2 = 30.04°$

$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

$n_1 = 1.00$ $n_2 = 1.49$ ← Red 1.53×0.98

$\theta_1 = 50$ $\theta_2 = 30.72°$

$n_2 = 1.49$ $n_3 = 1.00$

$\theta_2 = 0.68°$ $\theta_3 =$

$\theta_3 = \sin^{-1}\left(\frac{n_2 \sin\theta_2}{n_3}\right)$

$\theta = 1.02°$